Stability evaluation of Perovskite-based solar cells

Duration: 6 months *(Starting from February / March 2018)*
Master Thesis
Skills: semi-conductor physics, instrumentation, materials & processes, data analysis

Location: CEA/LITEN/DTS
INES (Solar Energy National Institute) - Savoie Technolac BP332 - 50 avenue du Lac Léman- 73377 Le Bourget du lac

Over the last decades, the development of low-cost photovoltaic cells alternative to crystalline silicon ones has progressed following two paths: inorganic-based thin films and organic ones. Unfortunately, until very recently, there was no semiconducting material that could both be processed at low temperature *via* wet process and provide sufficient efficiencies to compete with silicon-based technologies.

Yet, in the past few years, several works showed that lead-based organohalide perovskite could fulfil all these requirements. This kind of material can then be integrated into PV devices *via* wet processing and lead to efficiencies in excess to 20%. This represents a remarkable technological jump for the development of low cost solar cells.

No matter how promising these efficiencies are, such devices will remain far from any practical application if their operating stability is not substantially increased.

This internship will thus be dedicated both to the investigation of the stability of a variety kinds of perovskite-based devices made in the lab under illumination and to the elucidation of the corresponding degradation pathways.

The following targets have been defined for this internship:

- Setting up of experimental protocol allowing for a comparative study of devices stability
- Investigation of the influence of device architecture and materials type on device stability
- Identification of degradation root causes and impacted materials
- Identification of alternatives with enhanced stability

In addition to the ageing equipments available in the lab, a range of characterization tools may be used to investigate degradation pathways.

Internship will take place at the Solar Energy National Institute (le Bourget du Lac).

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Send Résumé & Motivation Letter